

**Environmental Assessment
for the Construction and
Operation of
Microwave Antennas**

**To Support The
Naval Research Laboratory
Navy Technology Center
for
Safety and Survivability
ex-USS SHADWELL**

**Mobile Bay
Mobile, Alabama**

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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT FOR CONSTRUCTION AND
OPERATION OF TWO MICROWAVE ANTENNAS TO SUPPORT THE NAVAL
RESEARCH LABORATORY, NAVY TECHNOLOGY CENTER FOR SAFETY AND
SURVIVABILITY, MOBILE BAY, MOBILE, ALABAMA

Pursuant to Council on Environmental Quality regulations (40 CFR Parts 1500-1508) implementing procedural provisions of the National Environmental Policy Act, the Department of the Navy gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement is not being prepared for the construction and operation of two antennas to support the Naval Research Laboratory (NRL) Navy Technology Center for Safety and Survivability, aboard the fire research vessel ex-USS Shadwell, berthed at Little Sands Island, Mobile Bay, Mobile, Alabama.

The proposed action is to construct and operate a two-way communication system consisting of two microwave antennas: Antenna 1 to be located on Little Sands Island, and Antenna 2 to be located on top of the USS Alabama Memorial Park building. Antenna 1 will be approximately fifty feet tall, of mono-pole construction, and will be mounted on a concrete pad approximately four square feet in size. No guy wires will be required to steady the antenna. An eight by ten foot metal building will be constructed to house all necessary digital equipment, and will be mounted on an eight by ten foot concrete pad. The total footprint for Antenna 1 and it's associated building will be 88 square feet. Transmission of data from the Technology Center to the antenna system will be via field wire laid along dock and ground. Antenna 2 will be placed on a mount on the roof of the USS Alabama Memorial Park building. All necessary digital equipment will be housed in existing space within the building. Transmission between the two antennas will be via commercial leased data lines.

As the Navy reduces the number of personnel aboard ships, the use of sensor systems will increase. Military applications of sensor systems' research and development (R&D) include the development of fire and damage control sensors, and communication and data transmission links necessary to transmit information to a centrally located evaluation facility. The microwave antenna system will be used to demonstrate the ability of newly developed sensors to transmit usable data to centralized damage control facilities. These studies are considered high priority research by the Navy. Without the proposed project the Navy will not be able to meet mission requirements at NRL, will not be able to support ship personnel with critical data, and will not be able to advise ship personnel of fire and damage control in time of need.

Three alternative locations and the no action alternative were evaluated for each of the antennas. The no-action alternative was found unacceptable because the Navy would lack the capability to support high priority research and development efforts to ensure the safety and survivability of ships and crews. The three

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alternatives for the location of Antenna 1 include mounting on top pilings adjacent to the Shadwell's berthing area, mounting the antenna on the Shadwell, and constructing the antenna and support building on Little Sands Island. Mounting the antenna on the pilings or on the Shadwell was found to be unacceptable because movement of the pilings or the ship caused by tides, storms, or dredging operation will cause adverse effects to the alignment of the antenna and necessary data transmission. The proposed location for Antenna 1 is on Little Sand Island. The three alternatives for the location of Antenna 2 include on top of building S-108 at the USCG Station on South Broad Street, Mobile; atop the U.S. Army Corps of Engineers, Mobile District Building on 109 St. Joseph Street, Mobile; and atop the USS Alabama Memorial Park building, Mobile, Alabama. The height of the antenna would have to be 100 feet or greater at both building S-108 and the COE Building in order to ensure that mobile cargo loading equipment and larger ships using the adjacent channel would not pass between and block the transmission. These engineering conditions would require extra materials and the need for navigational warning lights. The increased height of the antenna would cause aesthetic impacts as well. The preferred alternative is to construct Antenna 2 atop the USS Alabama Memorial Park building because it provides the clearest line of site for transmission, as well as will not impact any passing cargo loading or large ship activity on the channel.

No significant impacts will occur because of the proposed action. Eighty-eight square feet of land will be impacted by the construction of Antenna 1. No trees will be removed for the construction or operation, and only minor grading may be necessary. No alteration to stream geomorphology, location or configuration will occur due to the proposed project. No jurisdictional wetlands are located within the proposed project area. Little Sands Island is man made from the material dredged from the Mobile River. Its soils are sandy loam, and are well drained. The increase of 88 square feet of impervious surface on Little Sands Island will not increase the run-off or affect the water table significantly. No endangered or threatened species are located within the proposed construction and operation areas. The South Alabama Regional planning Commission has concurred with the Navy's findings that the proposed project will not affect the Alabama coastal zone, and is consistent with the Alabama Coastal Zone Management Plan.

No significant increase in noise is anticipated because of the proposed project. Temporary, minimal noise increase may occur during the construction of the antenna system. The operation of the antenna system will produce no increase in air emissions. Short term, fugitive air emissions may be generated during the construction of Antennas 1 and 2. Dust control measures will be implemented during construction. Little Sands Island is in attainment for all of the six criteria pollutants addressed in the Clean Air Act. No conformity analysis is required. Small amounts of potentially toxic and hazardous materials will be used to clean electronic components. All such materials used will be handled, stored, and managed under applicable Federal and State permitting requirements. No asbestos-containing materials would be used for

the proposed project. No cultural or historic resources are present at the proposed project sites, and thus none will be impacted. The Little Sands Island is uninhabited. No disproportionate impacts to any low income or minority populations are expected because of the proposed project

The proposed project is a permanent, point-to-point, microwave communications system. The only non-ionizing radiation source is the microwave transmitters located at the top of the antenna towers. The system will not cause any Electromagnetic Interference or generate Electromagnetic Radiation (EMR) that would adversely affect any local organization or environment. The transmission beam will be projected directly towards the other stationery antenna, and will have a beam width of only 2.2 degrees. The EMR level will not exceed 0.012mW/cm^2 , which is well below the safe threshold for the human environment of 5.3mW/cm^2 . The system will pose no EMR hazard to migratory birds, local wildlife, or humans because of the low transmission levels, and narrow beam widths.

Based on information gathered during preparation of the EA, the Navy finds that the proposed construction and operation of the microwave antenna system to support the NRL Technology Center research efforts in Mobile Bay, Alabama, will have no significant impact on the environment.

The EA addressing this action may be obtained from: Commanding Officer, Naval Research Laboratory, Office of Naval Research, 800 North Quincy Street, Arlington, Virginia 22217-5660 (Attn: Mr. Fred Esposito, Code 91), telephone (703) 696-4613. A limited number of copies of the EA are available to fill single copy requests.

19 July 1995

Date

Thomas J. Peeling

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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

NOTICE OF AVAILABILITY FOR THE FINDING OF NO SIGNIFICANT IMPACT FOR CONSTRUCTION AND OPERATION OF TWO MICROWAVE ANTENNAS TO SUPPORT THE NAVAL RESEARCH LABORATORY, NAVY TECHNOLOGY CENTER FOR SAFETY AND SURVIVABILITY, MOBILE BAY, MOBILE, ALABAMA

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The EA addressed three alternative locations, including the no-action alternative. The no-action alternative was found to be unacceptable. Navy considers research and development (R&D) of these sensor systems a high priority to ensure the safety and survivability of ships and crews. The microwave antenna system will be used to demonstrate the ability of newly developed sensors to transmit usable data to centralized damage control facilities.

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Reg. Sept. 9, 1995

LESLEY SENNE being sworn, says that he is BOOKKEEPER of The Mobile Press and The Mobile Register, daily newspapers printed and published in the City and County of Mobile, State of Alabama; and the attached notice appeared in the issue of

The Mobile Press The Mobile Register

SEPT 9, 1995

Sworn to and subscribed before me this 10

day of OCT 19 95

Lesley Senne
Charlene J. Daniels
 Notary Public

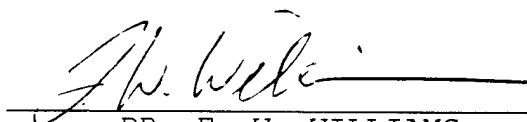
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ex-USS SHADWELL, MOBILE, ALABAMA

ENVIRONMENTAL ASSESSMENT

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FOR THE CONSTRUCTION OF
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TO SUPPORT THE NAVAL RESEARCH LABORATORY
NAVY TECHNOLOGY CENTER FOR
SAFETY AND SURVIVABILITY
ex-USS SHADWELL
MOBILE BAY, MOBILE ALABAMA

MARCH 1995

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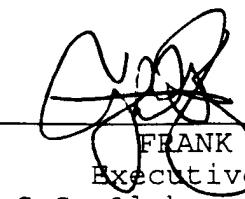
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NAVY TECHNOLOGY CENTER FOR
FIRE AND SURVIVABILITY
ex-USS SHADWELL
MOBILE, ALABAMA

MARCH 1995

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ENVIRONMENTAL ASSESSMENT
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LIST OF ACRONYMS

AC	Acres
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm ²	Centimeter squared
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMR	Electromagnetic Radiation
FONSI	Finding of No Significant Impact
HA	Hectares
M	Meters
mW	Milliwatt
NEPA	National Environmental Policy Act
NRL	Naval Research Laboratory
OPNAVINST	Chief of Naval Operations Instruction
SF	Square Feet
USCG	United States Coast Guard

SUMMARY

ACTION

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Environmental Assessment
For The Construction and Operation
of Microwave Antennas
To Support the Naval Research Laboratory
Navy Technology Center for
Safety and Survivability
ex-USS SHADWELL
Mobile Bay, Mobile, Alabama

- [] Draft Environmental Assessment
 Environmental Assessment

INFORMATION CONTACT

Interested individuals or groups may obtain additional information concerning the proposed project by contacting the following:

Naval Research Laboratory
Attn: Environmental Coordinator, Code 3504
4555 Overlook Avenue S.W.
Washington, D.C. 20375-5000

BACKGROUND

The United States Coast Guard's Fire and Safety Test Detachment was established on Little Sand Island in 1969. Under a joint Research Agreement with the USCG, NRL has berthed a Fire Research and Test Ship, the ex-USS SHADWELL, at this location since 1988. The NRL-Navy Technology Center for Safety and Survivability uses the SHADWELL as a full size test bed during the final phases of development of both firefighting equipment and damage control techniques. The SHADWELL provides the Navy with the opportunity to evaluate the developing Technology in actual shipboard conditions. As a facility on the forefront of technological research and development in the field of ship safety and survivability, the NRL-SHADWELL is the Navy's principal laboratory performing these types of research.

Without adequate space to conduct actual fire research under controlled shipboard conditions, NRL cannot carry out its mission in developing fire and damage control sensors capable of transmitting usable data to evaluation centers located at shore facilities.

PROJECT DESCRIPTION

The proposed project is to construct and operate a two-way communications system consisting of two separate Microwave antennas. This communications system is part of the technological requirements in the development of the remote sensing devices. These antennas will ensure that the sensors being developed gather data that can be successfully transmitted to a centralized evaluation center located at a shore facility. The proposed project will enable the NRL to achieve its mission by demonstrating the ability to transmit the data gathered from newly developed sensors to a remote location for evaluation.

This environmental assessment (EA) has been prepared to develop and evaluate alternative actions for the proposed project; assess potential environmental impacts of the alternatives; recommend appropriate measures to avoid, reduce, or mitigate adverse environmental impacts; recommend a proposed action; and determine if the potential impacts are significant enough to require preparation of an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

While the antennas discussed in this document will maintain two-way communication capabilities, for clarification purposes, the Little Sand Island antenna shall hereafter be referred to as the "transmission" antenna. The second antenna, to be located some distance from the ex-Shadwell shall be referred to as the "receiving" antenna.

ALTERNATIVES

Three proposed "build" alternatives for a Microwave "transmission" antenna (A, B, and C), three proposed "build" alternatives for a Microwave "receiving" antenna (C, D, and E), and the "no-action" alternative were evaluated.

The No-Action Alternative, defined as not constructing the proposed project, would negatively impact the NRL mission in several ways:

- NRL would be unable to meet long-term mission requirements,
- The Navy will lack capability to support high priority research in remote sensor and data transmission development.
- Ship personnel will not be supported by critical data processing or evaluation.
- Fire and damage control support and advise will not be available to ship personnel during times of need.

All "build" alternative actions would include construction of the proposed project (consisting of a Microwave antenna and digital equipment building) at two separate locations. One antenna on one of three alternative "transmission" antenna sites, and the other on one of the three "receiving" antenna sites.

Alternative A would be to locate the proposed "transmission" antenna and support building on Little Sand Island. The Island, which was man made, is undeveloped. Alternative A would not require the removal of any trees. Disturbance would be limited to the footprint of the antenna and support building, approximately 88 square feet (SF).

Alternative B would mount the proposed "transmission" antenna on pilings placed in the water directly next to the Shadwell. These waters are subject to tidal movement, and the area requires periodic dredging to maintain a depth of 26 feet. Alternative B may require the installation of a tracking pedestal to compensate for any movement of the antenna.

Alternative C would mount the proposed "transmission" antenna on the mast of the Shadwell. Alternative C would require the installation of a tracking pedestal to compensate for movement of the Shadwell.

Alternative D would mount the proposed "receiving" antenna on an existing building (S-108) located at the USCG Station, South Broad Street, Mobile, Alabama.

Alternative E would mount the proposed "receiving" antenna on the U.S. Army Corps of Engineers, Mobile District Building. This building is located at 109 St. Joseph Street, Mobile, Alabama.

Alternative F would mount the proposed "receiving" antenna on an existing building located at the U.S.S. Alabama Memorial Park, Mobile, Alabama.

The alternative actions were evaluated for compatibility with the SHADWELL's location and mission, environmental effects, costs, and engineering considerations.

Compatibility with NRL's Mission. Alternative A is the "transmission" antenna alternative most compatible with the NRL mission. Alternative B & C would subject the "transmission" antenna to movements without the installation of tracking devices. This could adversely impact research and development of remote sensors. All three "receiving" antenna Alternatives are compatible with NRL's mission. The No-Action Alternative would severely limit the ability of the NRL to meet mission requirements.

Environmental Effects. The primary environmental effect from development of Alternative A would be the 88 sf of land on which the "transmission" antenna and support equipment building would be situated. Alternative B would require the placement of pilings in navigable waters.

Costs. Alternative A would have the lowest overall additional costs of the three "transmission" antenna "build" alternatives. Alternative F would have the lowest overall additional costs of the three "receiving" antenna "build" alternatives. The No-Action Alternative would severely limit the ability of the NRL to meet mission requirements.

Engineering Considerations. Because of the movement, design issues and costs for "transmission" antenna Alternatives B and C would be the highest. Alternative A would require the fewest engineering considerations of the three "transmission" antenna alternatives. To overcome loss of signal caused by the passage of ships, and/or the movement of mobile cargo loading equipment, the design issues for "receiving" antenna Alternatives D & E would be the highest. Alternative F would require the fewest engineering considerations of the three "receiving" antenna alternatives. The No-Action Alternative would impede NRL's ability to develop remote sensing and data transfer systems.

In summary, Alternative A would have the least overall combined impacts of the proposed alternative actions for the "transmission" antenna, and Alternative F would have the least overall combined impacts of the proposed alternative actions for the "receiving" antenna. The construction of the 'transmission' antenna at Alternative A and the construction of the "receiving" antenna at the Alternative F sites is recommended as the proposed action.

ENVIRONMENTAL IMPACTS

Impacts on the Social Environment

Land Use All alternatives would be compatible with the existing and proposed urban land use.

Socioeconomic Factors The socioeconomic factors considered in the analysis included: land management, utilities, and personnel time management. No alternatives would negatively impact any socioeconomic factor.

Cultural Resources No known cultural, historical or archeological, resources would be impacted by any of the alternatives.

Impacts on the Physical Environment

The alternatives would not significantly affect the land resources such as topography, geology, soils, geomorphology, or floodplains. Potential negative impacts to groundwater resources, air resources, and noise would be short term.

The proposed project would have no impact on surface waters.

Energy resource requirements are projected to be within current source availability. Resource demand would be minimized through energy conservation design, materials selection, construction, and operation.

All toxic, and hazardous materials would be used, handled, stored, and managed under applicable Federal and State permitting requirements. No solid waste would be generated by the proposed antennas. Only sources of non-ionizing radiation would be used at the proposed facility. All such sources would be monitored and maintained in compliance with Federal and State regulatory permitting requirements.

Aesthetic and visual quality from the alternatives would be compatible with other architectural structures within the affected antenna locations and the natural aesthetics/visual quality would not be diminished.

Impacts on the Ecological Resources

There would be no impacts to known threatened or endangered flora, aquatic fauna, or terrestrial fauna from development of any of the alternatives.

Cumulative Impacts

The construction and operation of the antennas would not cause significant cumulative impacts at any of the alternatives.

CONCLUSION AND RECOMMENDATION

Construction and operation of the proposed "transmission" antenna at the Alternative A site, and the "receiving" antenna at the Alternative F site is recommended for implementation as the proposed action.

Construction and operation of the proposed antennas would provide NRL with the ability to transmit sensor data to a distant centralized evaluation center. The Alternative A & F sites are the "build alternatives" most compatible with current and future mission operations at the NRL-SHADWELL. These Alternatives have the least potential for environmental impacts, least cost, and least engineering considerations.

Construction and operation at the Alternative A & F sites would not have significant short- or long-term adverse or cumulative environmental impacts. A Finding of No Significant Impact (FONSI) is recommended for the proposed action.

ENVIRONMENTAL ASSESSMENT
FOR THE CONSTRUCTION AND
OPERATION OF
MICROWAVE ANTENNAS
TO SERVE THE NAVAL RESEARCH LABORATORY
NAVY TECHNOLOGY CENTER FOR
SAFETY AND SURVIVABILITY
ex-USS SHADWELL
MOBILE BAY, MOBILE, AL.

1.0 INTRODUCTION

1.1 **ENVIRONMENTAL ASSESSMENT PURPOSE**

An environmental assessment (EA) has been prepared for the proposed project, construction and operation of Microwave Antennas to:

- Develop and evaluate reasonable alternative actions for the proposed project;
- Assess the potential environmental impacts of the alternative actions;
- Recommend appropriate measures to avoid, reduce, or mitigate adverse environmental impacts;
- Recommend a "proposed action"¹, and
- Determine if the impacts are of sufficient magnitude to require preparation of an environmental impact statement or, alternately, recommend a Finding of No Significant Impact (FONSI).

1 "Action", as defined under the National Environmental Policy Act (NEPA), includes "new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals. . . Federal actions tend to fall within one of the following categories: (1) adoption of official policy; (2) adoption of formal plans, upon which future agency actions will be based; (3) adoption of programs; (4) approval of specific projects . . ." (40 CFR Part 1508.18).

This EA and the related public involvement process for the proposed action must comply with the requirements of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1B and the President's Council on Environmental Quality (CEQ) Regulations for Implementing the Provisions of the National Environmental Policy Act (NEPA) (40 CFR, Title 49, Sections 1500-1508).

1.2 ENVIRONMENTAL ASSESSMENT SCOPE

The Department of the Navy, Naval Research Laboratory (NRL), proposes to construct and operate a Microwave Antenna on Little Sand Island located in Mobile Bay, and a second antenna on an existing administration building located at the U.S.S. Alabama State Park, Mobile Alabama. Both antennas shall be capable of maintaining two-way communication capabilities. The proposed project will consist of the construction of one Microwave Antenna (hereafter referred to as the "transmission" antenna) approximately fifty foot (50') tall (15.4 meters(M)) and an eight foot by ten foot (8'X 10') metal building which will house the necessary digital interface equipment. The second Microwave Antenna (hereafter referred to as the "receiving" antenna) will consist of an antenna and antenna mount located on an existing building at the USS ALABAMA Memorial Park. The antennas will support Research and Development (R&D) being conducted aboard the NRL fire research vessel ex-USS SHADWELL. The SHADWELL is permanently berthed at the U.S. Coast Guard's Fire and Safety Test Detachment, Little Sand Island, Mobile, Alabama.

2.0 PURPOSE & NEED

2.1 EXISTING NAVAL RESEARCH LABORATORY FACILITIES

The Department of the Navy, Naval Research Laboratory (NRL), as part of NRL's Navy Technology Center for Safety and Survivability, operates a full scale Fire Research and Test Ship, the ex-USS SHADWELL, at the U.S. Coast Guard's (USCG) Fire and Safety Test Detachment, Little Sand Island, Mobile, Alabama. The SHADWELL is permanently berthed at this location.

2.1.1 Little Sand Island

Little Sand Island is located along the southern edge of the Gulf Coastal Plain near the Gulf of Mexico. The Island is within the City of Mobile, Alabama Corporate limits and approximately 55 miles (88.5 kilometers) northwest of Pensacola Florida. [See Figure 2.1 for general location of Little Sand Island.] Little Sand Island, which was man made, consists of approximately 53 acres (ac) [21.04 hectares(ha)] of State of Alabama-owned land. The Island, which is completely surrounded by water, is due East of McDuffie Island, and South of Pinto Island. It is adjacent to the main shipping channel at the mouth of the Mobile river. The exact location is; 30 degrees, 39 minutes, 26 seconds North, and 88 degrees, 1 minute and 34 seconds West. Little Sand Island is part of Mobile County, Alabama.

Little Sand Island was originally man made. In 1880, the mouth of the Mobile river was dredged to form a ship channel which would allow larger draft ships access to local port facilities. The materials removed during this process were deposited next to the channel. Over time the dredged material, through natural processes, formed what is now known as Little Sand Island. The Island consists of approximately 53 AC of dredged sediment material. Over time, through natural processes, vegetation became established on the Island. Until recently, approximately 90 percent of the Island was covered by low growing shrubs, brush, and trees native to the Mobile area. Approximately 20 acres of the Southeast end of the island are currently being prepared to receive additional dredge spoils. While periodic dredging spoil depositing has continued on the Island, tidal erosion has prevented any significant increases in acreage. To eliminate the possibility of brush fires, mowing operations are conducted on the Island on an average of three times each year.

The USCG's Fire and Safety Test Detachment was established on Little Sand Island in 1969, and since that time the Island has been leased by, and under the control of the USCG. Under a Joint Research Agreement with the USCG, NRL has berthed a Fire Research and Test Ship, the ex-USS SHADWELL at this location since 1988. The Navy Technology Center for Safety and Survivability uses the SHADWELL for testing new fire fighting equipment and damage

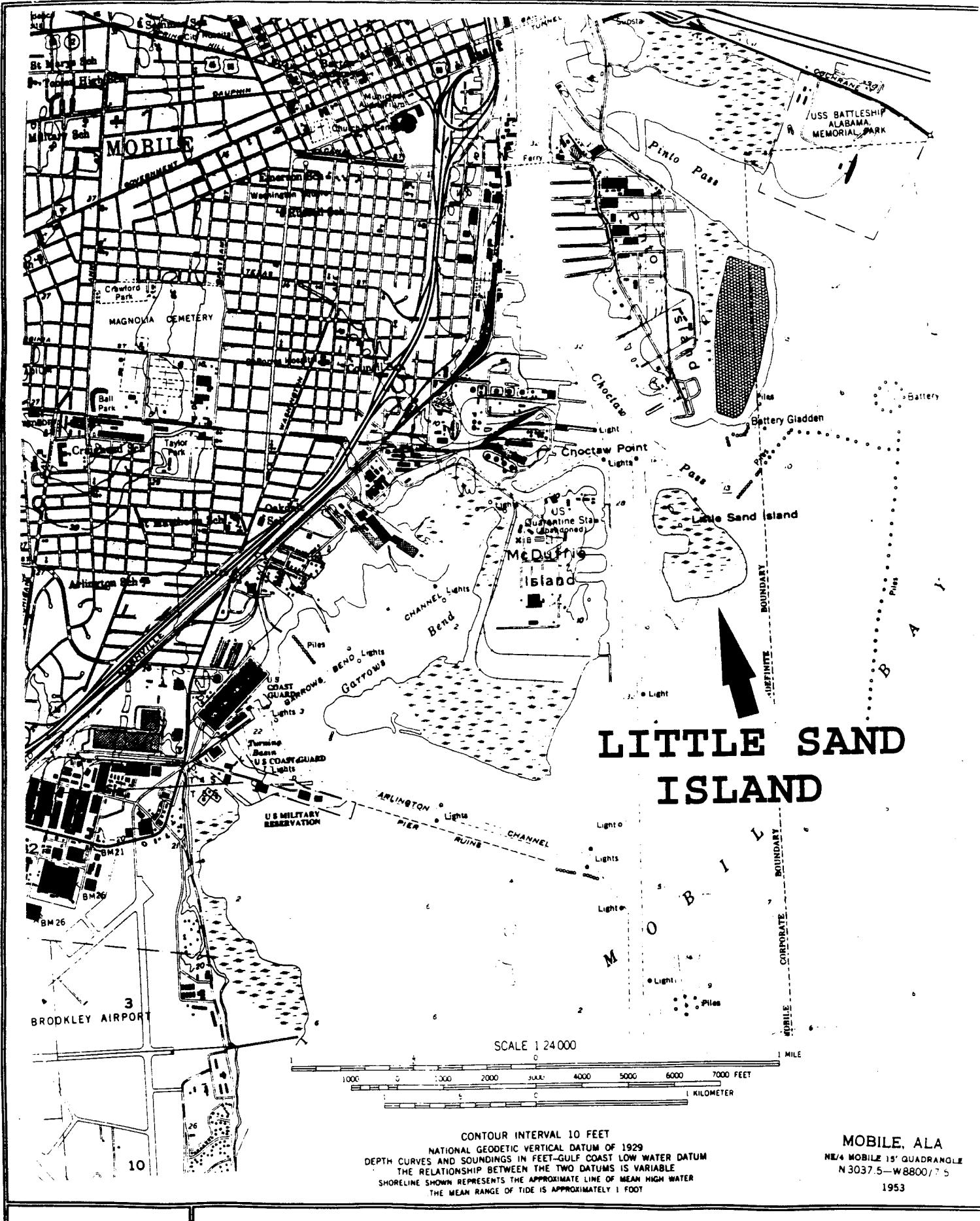


Figure 2.1

Little Sand Island Location Map

control techniques during the final phases of Research and Development (R&D). As a facility on the forefront of fire suppression and ships damage control this has become the Navy's principal laboratory for performing testing and evaluation of new equipment and techniques under actual shipboard conditions.

There are currently three fire testing ships berthed at Little Sand Island, the NRL's SHADWELL, and two ships owned by the USCG. Access to Little Sand Island is by small launch. Under normal operating conditions, all NRL activities are conducted aboard the ship, and actual access to the Island is very limited.

2.2 PROPOSED FACILITY PURPOSE AND NEED

The proposed project, construction and operation of the Microwave Antennas and digital equipment sheds will provide NRL with the ability to transmit data gathered from remote sensing devices during initial sensor R&D. The military applications for R&D in these areas include: development of fire and damage control sensors; and, communication and data transmission links necessary to transmit information to a centrally located evaluation facility. As the Navy reduces the number of personnel aboard ships, sensor systems' use will increase. The Microwave Antenna will be used to demonstrate the ability of newly developed sensors to transmit usable data to centralized damage control facilities. This system will establish two-way transfer of sensor and damage control data, video, and command and control functions, allowing the Navy to provide expert off-board telepresence.

As the lead laboratory in the development of these sensors and transmission links, the NRL's ability to support the Navy will be handicapped in several ways if the proposed project is not constructed:

- Without the proposed project, the Navy will not be able to meet mission requirements at NRL-SHADWELL.
- The Navy will lack capability to support high priority research in remote sensor and data transmission development.
- Ship personnel will not be supported by critical data processing or evaluation.
- Fire and damage control support and advise will not be available to ships personnel during times of need.

Sensor development requires that data be transmitted from ship via radio or satellite to shore. Using a combination of

Microwave transmissions and hard line communication equipment, the data would be forwarded to central locations for evaluation. Damage control, and fire fighting recommendations would be transmitted back to the ship via the same lines of communication.

2.3 PROPOSED FACILITY DESCRIPTION

2.3.1 Transmission Antenna Facility

The proposed "transmission" antenna facility will consist of a 50' (15.4 M) Microwave Antenna of Mono-pole construction (requiring no guy wires), and an 8'X 10' metal building. The Antenna would be mounted on a concrete pad approximately two feet by two feet (2'X 2'). The metal building which will house the antennas digital equipment will be mounted on an 8'X 10' concrete pad. The approximate total footprint area for the antenna and support building will be eighty-eight square feet (88 sf). Transmissions of data from the SHADWELL to the antenna will be via umbilical cord. This umbilical cord shall not interfere with mowing operations.

The facility will require only minor site grading. No trees will be disturbed.

2.3.2 Receiving Antenna Facility

The proposed "receiving" antenna facility will consist of an antenna and antenna mount which would be placed on the roof of an existing administration building located at the USS ALABAMA Memorial Park. A space in the existing building would be used to locate and operate the microwave interface equipment. Transmission from the "Receiving" antenna to NRL would be via commercial land leased data lines. The facility would not alter existing environmental conditions.

3.0 ALTERNATIVES

Following the CEQ regulations implementing NEPA, and the requirements of OPNAVINST 5090.1B, this EA develops and addresses reasonable alternatives for the proposed action. Included in the alternatives is the "no-action" alternative, under which the proposed project construction would not take place.

The "build" alternative actions assume, as a given condition, that the transmission and receiving antennas, and support buildings will be constructed. [See Section 2.3 Proposed Facility Description for a summary of the project requirements.] The primary difference among the proposed alternatives include wetlands permitting, and transmission signal interference.

The alternative actions are described in Section 3.1. The rationale for and evaluation of the proposed alternatives are discussed in Section 3.2. Identification of one alternative as the proposed action is provided in Section 3.3. The proposed action is the project alternative that causes the least overall combined socioeconomic, physical, ecological, and cumulative impact.

3.1 ALTERNATIVE ACTIONS

The alternative actions include the No-Action alternative, three "build" alternatives for the "transmission" and three "build" alternatives for the "receiving" antennas.

3.1.1 No-Action Alternative

The "No Action" alternative is defined as not constructing the Microwave Antennas. As described in Section 2.2, the NRL's mission will be negatively impacted in following ways:

(1) **Inability to achieve mission requirements** -- The NRL's mission requirements would not be achieved without the proposed project. Without the Microwave Antennas, capabilities to conduct research on new sensor development and data transmission will be severely handicapped. As the lead laboratory in the development of shipboard fire and damage control equipment and techniques, the NRL's ability to support the Navy in remote sensor development will be diminished.

(2) **Ships Personnel** -- The ability of the Navy to support ship personnel through data processing and evaluation would be severely limited. Fire and damage control support and advise will not be available to ships personnel during times of need.

(3) **Severe Handicapping of NRL's ability to support the Navy** -- As the Navy's lead laboratory in shipboard sensor development and research, the lack of the needed ability to transmit sensor data

to distant locations will severely handicap NRL's ability to develop new equipment required by the Navy. The Navy will lack the capability to support high priority research and development efforts to ensure the safety and survivability of ships and crews.

3.1.2 Alternative A - Transmission Antenna

Under Alternative A, the proposed "transmission" facility (antenna and support building) would be constructed on Little Sand Island. [See Figure 3.1]

Development at the Alternative A "transmission" antenna site would be limited to minor grading. The antenna and support building would be mounted on concrete pads with a total footprint of approximately 88 sf. Power and data transmission to the antenna would be via umbilical from the SHADWELL.

The height of the antenna would be determined by the location of the "receiving" antenna, as discussed in sections 3.1.5, 3.1.6, and 3.1.7.

3.1.3 Alternative B - Transmission Antenna

The Alternative B site would be to mount the "transmission" antenna on pilings adjacent to the ships berthing area. [See Figure 3.2] The digital equipment necessary to support the antenna would be mounted on board the Shadwell. The installation of the pilings would require a permit from the Army Corps of Engineers.

The berthing area requires periodic dredging to maintain a depth of 26'. This routine dredging could impact the stability of the pilings. Any movement of the pilings, caused by tides, storms, or dredging operations would adversely effect the alignment of the antenna, and necessary data transmission.

The height of the antenna would be determined by the location of the "receiving" antenna.

3.1.4 Alternative C - Transmission Antenna

The Alternative C site would be to mount the "transmission" antenna on the SHADWELL. [See Figure 3.1] Antenna alignment would be effected by tidal changes, and movement of the SHADWELL. To compensate for these changes, The Alternative C site would require the installation of a tracking pedestal to maintain antenna alignment. This would increase the number of factors that must be considered during the early stages of sensor development.

3.1.5 Alternative D - Receiving Antenna

The Alternative D site would be to mount the proposed "receiving" antenna on an existing building (S-108), located at the USCG Station, South Broad Street, Mobile Alabama 36615-1384. [See Figure 3.2 for the approximate Alternative D site location.]

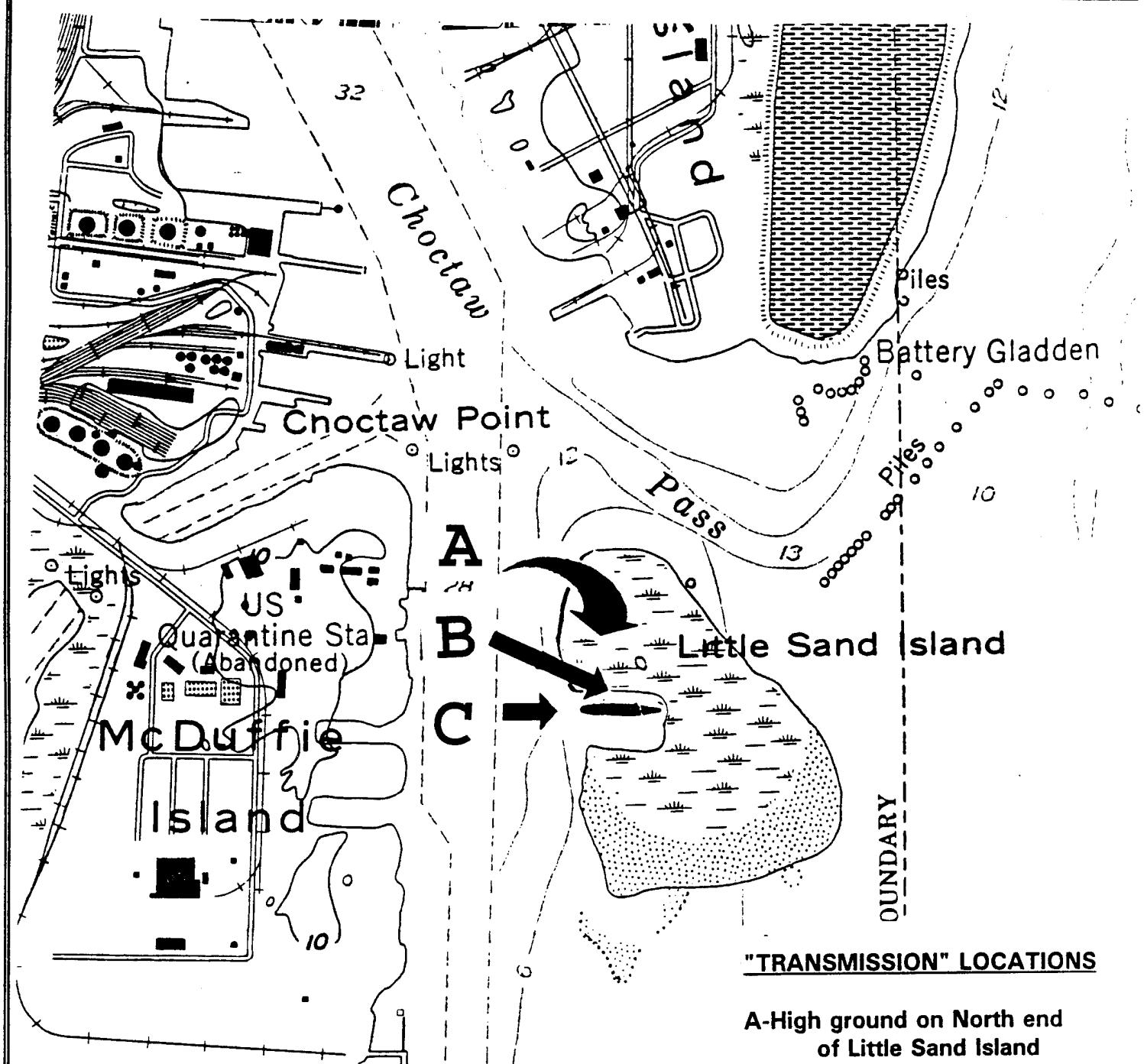
To eliminate signal disruption caused by passing ships, and equipment used to load cargo (cranes, mobile conveyers, etc.), the height of both the "transmission" and "receiving" antennas would have to be approximately 100' to allow for a direct line of sight between both antennas. The close proximity to Brookley Airport (located 3 miles Southwest of Little Sand Island) could require additional permits and the installation of navigational warning lights on antennas of this height.

3.1.6 Alternative E - Receiving Antenna

The Alternative E site would mount the "receiving" antenna on the U.S. Army Corps of Engineers, Mobile District Building. This building is located at 109 St. Joseph Street Mobile, Alabama 36602. [See Figure 3.2] To eliminate signal disruption caused by passing ships and equipment used to load cargo, the height of the "transmission" antenna would have to be approximately 100'. This would allow uninterrupted line of sight between both antennas. The close proximity to Brookley Airport could require additional permits and the installation of navigational warning lights on antennas of this height.

3.1.7 Alternative F - Receiving Antenna

The Alternative F site would mount the "receiving" antenna on the roof of an existing building located at the USS ALABAMA Memorial Park, Mobile Alabama. [See Figure 3.2] The Alternative F site will consist of an antenna and antenna mount on an existing building. Existing spaces in the building will be used house the necessary digital equipment. Antenna height requirements at the Alternative F site are less than those at other receiving antenna Alternatives. Tall ships, and/or cargo loading equipment will not impact the direct line of site between the Alternative F "receiving" antenna and the Alternative A, B, and C "transmission" antenna sites.



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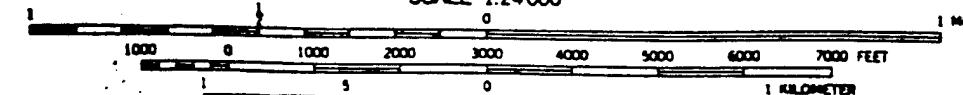


Figure 3:1

Proposed "Transmission" Alternative Sites

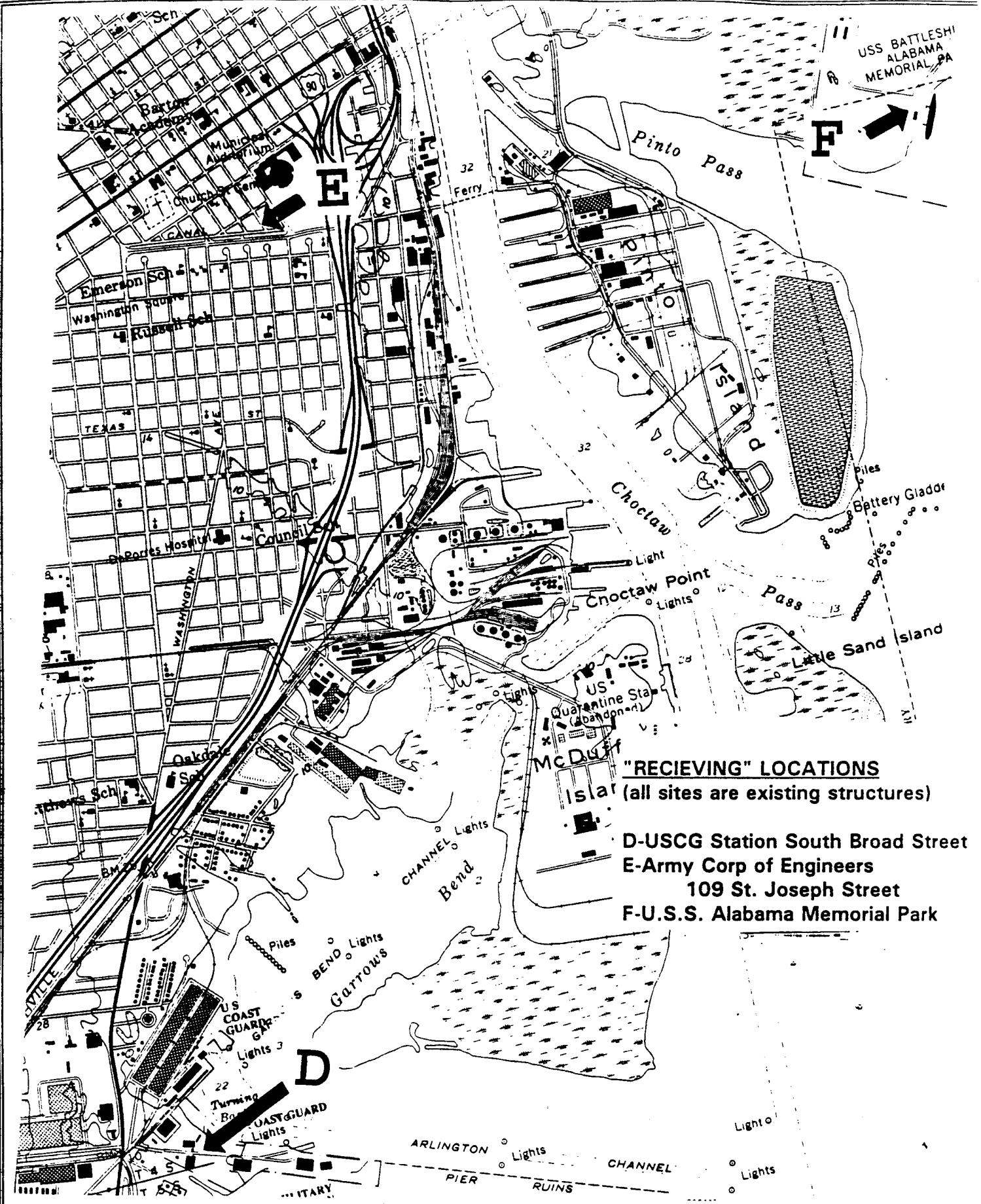


Figure 3.2

Proposed "Receiving" Alternative Sites

3.2 EVALUATION OF ALTERNATIVE ACTIONS

The alternative actions were evaluated in terms of compatibility with the NRL mission requirements, environmental effects, costs, and engineering considerations. The "No-Action" Alternative is described in sub-section 3.2.1. The three "transmission antenna "build" alternatives are described in sub-sections 3.2.2 (Alternative A), 3.2.3 (Alternative B), and 3.2.4 (Alternative C). The three "receiving" antenna "build" alternatives are described in sub-sections 3.2.5 (Alternative D), 3.2.6 (Alternative F), and 3.2.7 (Alternative G). Table 3.1 presents a summary of the evaluation of the alternative actions.

3.2.1 Compatibility with NRL Mission

The existing NRL mission requirements are to develop capabilities of transmitting data collected by remote sensors over long distances to a centrally located evaluation and control center. The transmission of this data is in support of currently ongoing R&D of remote damage control and fire sensors.

The proposed locations of the "transmission" antenna, Alternatives A, B, & C, are located within 300 feet of each other.

The Alternative A site has a distinct advantage over Alternatives B and C. The construction of the proposed "transmission" antenna on solid ground will eliminate loss of signal caused by antenna movement. Early stages of system development will concentrate on sensor R&D. The elimination of potential signal transmission problems during this phase of development will enhance the development of the required remote sensors.

Alternative site B may not be capable of maintaining the stability of the "transmission" antenna necessary to prevent signal loss, impeding the development of the remote sensors.

Alternative site C would subject the "transmission" antenna to tidal movement. These movements could result in loss of signal, impeding the development of the remote sensors.

Alternatives D, E, and F, the proposed locations for the "receiving" antenna would all use existing structures as the antennas base.

Alternatives D, and E would require that the height of the "transmission" antenna be increased. This would be necessary to ensure that mobile cargo loading equipment and larger ships using the channel would not pass between the "transmission" and "receiving" antennas, causing signal interruption.

TABLE 3.1
SUMMARY OF ALTERNATIVE EVALUATION FOR THE PROPOSED
PROJECT AT NRL-ex-SHADWELL

ALTERNATIVE	EVALUATION CRITERIA			
	COMPATIBILITY WITH NRL EX-SHADWELL	ENVIRONMENTAL EFFECTS	COSTS	ENGINEERING CONSIDERATIONS
No-Action	- reduces ability to achieve mission and support the Navy	- No effect	- No cost	
Alternative A	- achieve mission with the least interference	- Disturbance of approximately 88 SF for construction of concrete pad *	- Cost of cement pad installation	
Alternative B	- achieve mission but have possible interruptions due to motion from pilings	- installation of pilings into the water next to Ex-Shadwell *	- Installation of pilings in 26' water capable of supporting antenna	- additional considerations for water action and periodic dredging
Alternative C	- achieve mission but have possible interruptions due to motion from ship	- no impact do to installation on ship *	- installation of tracking pedestal to compensate for ship movement	
Alternative D	- achieve mission with some possible interference by ship channel traffic	- no impact due to installation on existing structure * Increase height requirements of Alternatives A, B, & C.	- additional materials for increased height and possible need of navigational warning lights	- added height for antenna tower
Alternative E	- achieve mission with some possible interference by ship channel traffic	- no impact due to installation on existing structure * Increase height requirements of Alternatives A, B, & C.	- additional materials for increased height and possible need of navigational warning lights	- added height for antenna tower
Alternative F	- achieve mission by providing the clearest possible pathway	- no impact due to installation on existing structure		

Alternative F would be the "receiving" antenna location most compatible with mission requirements. There are no ship channels and/or cargo loading equipment located between the Alternative F site and any of the proposed "transmission" antenna sites, Alternatives A, B, and C.

The No-Action Alternative, as described in Section 3.1.1, would severely diminish the ability of NRL to achieve its mission requirements.

3.2.2 Environmental Effects

The primary environmental impacts that would result from development of the three "transmission" antenna "build" alternatives are:

The Alternative A site would require the installation of a concrete pad on Little Sand Island. The footprint of the pad is approximately 88 sf.

The Alternative B site would require the placement of piles in the water next to the SHADWELL. Any construction within harbors or bays would require a permit from the U.S. Army Corps of Engineers.

The Alternative C site would have no environmental impacts.

The three "receiving" antenna sites would be on existing buildings. These sites would pose no environmental impacts.

3.2.2.1 Jurisdictional Wetlands

The proposed project will not impact Jurisdictional Wetlands.

3.2.2.2 Hydrology and Aquatic Habitat

The proposed project will not adversely impact Hydrology or Aquatic Habitat.

Alternative B would require the installation of pilings in the water next to the SHADWELL's berthing area. Since the berthing area is periodically dredged, no additional loss of Aquatic Habitat will occur.

3.2.3 Costs

Higher or unexpected costs that would be incurred above those considered normal for site development is an important alternative evaluation criterion. The overall development costs among the three alternatives, from lowest to highest, would be Alternative A, B, and C for the "transmission" antenna, and F, D, and E for the "receiving" antenna. The sources of the additional

development costs are summarized as follows:

Alternative B The installation of pilings in waters with a depth of 26' capable of supporting the antenna.

Alternative C Installation of a tracking pedestal to compensate for movement of the SHADWELL.

Alternative D and E Development of Alternative D and E would potentially require the highest overall costs. The overall height of both the "transmission" and "receiving" antennas would have to be increased to prevent loss of signal caused by passage of tall ships and/or movement of mobile cargo loading equipment. The close proximity of the Brookley Airport (located 3 miles Southwest of Little Sand Island) could require additional construction permits, and the installation of navigational warning lights on the antennas.

The No-Action Alternative would severely limit the ability of the NRL to meet mission requirements.

3.2.4 Engineering Considerations

While all of the alternative sites could be developed with the proposed project, Alternative B would require the most overall engineering design considerations. This Alternative would require the installation of pilings capable of supporting the "transmission" antenna in waters with a depth of 26 feet. The same area requires periodic dredging to maintain the necessary depth.

3.3 PROPOSED ACTION

The proposed action was selected by comparing the No-Action alternative and three "transmission" antenna building alternatives (A, B, and C), and the three "receiving" antenna building sites. By reviewing the alternative evaluation results in Section 3.2 and through a process of elimination, a proposed action was selected with the lowest overall combined impacts. [Table 3.1 summarizes the evaluation of alternatives.]

Compatibility with NRL Mission All "transmission" and "receiving" antenna Alternatives (A, B, C, D, E, and F) were compatible with the NRL mission requirements.

Environmental Effects Under "transmission" antenna Alternative A, the primary potential environmental effects associated with the proposed project are the disturbance of 88 sf of soil on Little Sand Island.

"Transmission" antenna Alternative B would require the installation of pilings in navigable waters next to the Shadwell

berthing area. These waters are subject tidal movement, and require periodic dredging.

Alternatives D and E would require that the height of the "transmission" antenna (Alternatives A, B, and C) be raised to prevent loss of signal.

Alternative F would have no environmental effects.

No loss of aquatic habitat or disruption of jurisdictional wetlands are associated with any Alternative antenna site.

Costs Alternative A would have the lowest overall additional costs of the three "transmission" antenna "build" alternatives.

Alternative F would have the lowest overall additional costs of the three "receiving" antenna "build" sites.

The No-Action Alternative would severely limit NRL's ability to meet mission requirements.

Engineering Considerations The Alternative A site would require the fewest engineering design considerations of the three "transmission" antenna alternatives.

The Alternative F site would require the fewest engineering design considerations of the three "receiving" antenna alternatives.

In summary, Alternative A would have the least overall combined impacts of the proposed "transmission" antenna, and Alternative F would have the least overall combined impacts of the proposed "receiving" antenna alternatives.

The construction of the "transmission" antenna at Alternative A site, and the "receiving" antenna at the Alternative F site is recommended as the proposed action.

4.0 EXISTING PHYSICAL ENVIRONMENT

4.1 Land Use

4.1.1 Alternative A, Little Sand Island

Little Sand Island is located along the southern edge of the Gulf Coastal Plain near the Gulf of Mexico. The Island is due East of McDuffie Island adjacent to the main shipping channel, and South of Pinto Island. The Islands exact location is: 30 degrees, 39 minutes, 36 seconds North, and 88 degrees, 1 minute, and 34 seconds West. Little Sand Island is within the City of Mobile Alabama Corporate limits and is approximately 55 miles (88.5 kilometers) northwest of Pensacola Florida. [See Figure 2.1 for general location of Little Sand Island.] Little Sand Island, which was man made, consists of approximately 53 acres (ac) [21.04 hectares(ha)] of government-owned land. The Island, which is completely surrounded by water, is located at the mouth of the Mobile river, and is part of Mobile County, Alabama.

4.1.2 Alternatives B & C

Alternatives B & C would not impact land use.

4.1.3 Alternatives D, E, & F

Under Alternatives D, E, and F, the "receiving" antenna would be constructed on an existing building.

Alternative F, the USS ALABAMA Memorial Park is approximately 1.7 Miles Northeast of Little Sand Island. It is located at the mouth of the Tensaw River. The exact location is: 30 degrees, 40 minutes and 58 seconds North, and 88 degrees, 00 minutes and 55 seconds West. Entrance to the Memorial Park is via U.S. Highway 90 Between Interstate 10 Exits 27 & 30. The street address is 2703 Battleship Parkway.

4.1.4 Soils

The Mobile County, Alabama Soil Survey indicates that soils comprising the Little Sand Island area, Alternative A, are dominantly sand. The soil is generally well drained. The alternative will not adversely impact soils outside the footprint area. Soil conditions at Alternative B are mostly sand. These sands are subject to movement, and the berthing area requires periodic dredging to maintain the required depth.

The other Alternatives, C, D, E, & F would not impact the soils.

4.1.5 Wetlands

There are no wetlands at any of the proposed Alternative sites.

4.2 Water Resources

The proposed project will not impact water resources at any Alternative site. Water resources on Little Sand Island, Alternative A, is limited to annual rainfall.

4.3 Air Resources

The portion of Alabama in which the proposed facilities will be located is considered to be in full attainment for all six pollutants addressed in the Clean Air Act. Consequently, no analysis or conformity determination was needed.

4.4 Noise

Fire suppression testing is done aboard ships berthed at Little Sand Island. Moderate levels of noise are generated during this testing.

4.5 Ecological Resources

4.5.1 Flora and Aquatic Fauna

Summaries of available inventories and studies of flora and Aquatic fauna in the Mobile area in which the Alternatives are located did not identify the presence of any threatened or endangered species in any of the areas affected by this EA.

4.5.2 Endangered & Threatened Species

Threatened and endangered species surveys have been conducted in the Mobile Bay area in which the Alternatives are located. These surveys and documented sightings have not revealed the existence of any threatened or endangered species in any of the areas affected by this EA.

5.0 ENVIRONMENTAL IMPACTS

5.1 IMPACT ASSESSMENT APPROACH

This section summarizes the potential environmental effects resulting from the proposed action and the two alternatives. The environmental impacts include:

- Impacts on the social environment;
- Impacts on the physical environment,
- Impacts on the ecological resources; and
- Cumulative impacts.

5.2 IMPACTS ON THE SOCIAL ENVIRONMENT

Impacts on the social environment include evaluation of impacts on land use, socioeconomic factors, and cultural resources.

5.2.1 Land Use

Land use associated with the proposed project will be limited to a footprint of 88 sf. This footprint is associated with the construction of the "transmission" antenna at the Alternative A site only. "Transmission" antenna Alternative B and C would not impact land use. Under Alternatives D, E, and F, the "receiving" antenna would be constructed on an existing building.

The No-Action Alternative would have no impact on land use.

5.2.2 Socioeconomic Factors

Socioeconomic factors relevant to the proposed action and evaluation of the alternatives include environmental justice, land management, utilities, and personnel time management.

5.2.2.1 Environmental Justice

There would be no disproportionate impacts to minorities or low income individuals at any of the proposed Alternatives.

5.2.2.2 Land Management

Alternative A, the construction of the "transmission" antenna on Little Sand Island will impact an area of approximately 88 sf. Overall land management of the remainder of the Island would remain the same.

The No-Action Alternative would not impact land management.

5.2.2.3 Utilities

All three "transmission" antenna locations, Alternatives A, B, and C will obtain the necessary utilities support (electricity) from the SHADWELL. Utility support would be via umbilical.

All three "receiving" antenna Alternatives, D, E, and F will obtain necessary utilities support from the building on which the antenna is mounted.

The No-Action Alternative does not affect utilities.

5.2.2.4 Personnel Time Management

Alternatives A, B, C, D, E, and F would maintain the efficiency of personnel time evident on the SHADWELL. Personnel can easily and quickly transmit data from sensors under R&D to remote locations, where the data will be evaluated. Personnel aboard the SHADWELL can then compare actual ship conditions with the evaluation compiled at the remote location. This will provide an immediate evaluation of the sensors capability.

The No-Action Alternative would negatively impact the ability of NRL to achieve mission requirements.

5.2.3 Cultural Resources

Cultural resources consist of historical and archeological resources.

None of the "build" Alternatives will impact any historical or archeological resources.

The No-Action will not impact any historical or archeological resources.

5.3 IMPACTS ON THE PHYSICAL ENVIRONMENT

Impacts on the physical environment include potential impacts on the land resources; water resources; non-ionizing radiation; and aesthetic and visual quality.

5.3.1 Land Resources

Land resources include topography, geology, soils, geomorphology, wetlands, and floodplains. Potential impacts are discussed for each resource in the following paragraphs.

5.3.1.1 Topography

The topography of all sites is basically level with no significant grade changes. None of the alternatives would

significantly change the existing topography.

The No-Action Alternative would not affect the existing topography of the area.

5.3.1.2 Geology

The strata of Alternative A & B is comprised of quaternary coastal deposits, sand, and sediments varying from gravel to clays dredged from the ship channel. The bedrock is thought to be as much as 10,000 to 12,000 ft (3,000 to 3,700 m) below the surface.

Alternatives C, D, E, F, and the No-Action Alternative will not significantly impact the underlying geology of the sites.

5.3.1.3 Soils

The Mobile County, Alabama Soil Survey indicates that soils comprising Little Sand Island, Alternative A, are dominantly sand. The soil is generally well drained. The alternative will not adversely impact soils outside the footprint area. Soil conditions of Alternative B are mostly sand. These sands are subject to movement, and the berthing area requires periodic dredging.

The No-Action Alternative, and the "build" Alternatives C, D, E, & F would not impact the soils.

5.3.1.4 Geomorphology

None of the alternatives will impact stream geomorphology. None of the alternative sites will alter stream location or configuration or are located adjacent to streams.

5.3.1.5 Wetlands

Because of the soil conditions prevalent on Little Sand Island, water percolates rapidly. The proposed project will not affect non-tidal wetlands.

The No-Action Alternative would not affect existing non-tidal wetlands.

5.3.1.6 Floodplains

None of the "build" Alternatives would impact floodplain areas.

The No-Action Alternative would not impact floodplain areas.

5.3.2 Water Resources

Water resources on Little Sand Island, Alternative A, are limited to annual rainfall. The proposed project will not effect water resources at any Alternative sites.

The No-Action Alternative would not impact water resources.

5.3.3 Air Resources

Short term, fugitive air emissions will be generated for all alternatives. These will result from the construction of the antennas. Control measures applied during the construction process will include techniques to avoid or minimize fugitive air emissions.

No Long-term air emissions from the proposed project are associated with energy requirements only. These requirements are met by excess capacity of the existing Shadwell generator.

The portions of Alabama in which the SHADWELL is located are considered to be in full attainment for all six pollutants addressed in the Clean Air Act. Consequently, no analysis or conformity determination was needed.

5.3.4 Energy Resources

The proposed alternatives would require energy resources for short term construction and long term operation and maintenance of the facility. The projection of energy requirements are within the quantity of energy resources available at SHADWELL, and at the "receiving" antenna Alternatives. Energy resources would be limited to electricity. The proposed project will have no impact on existing electrical generation capacity.

The No-Action Alternative will not impact the existing or future energy resources at the SHADWELL.

5.3.5 Solid, Toxic, and Hazardous Materials Management

All alternatives would use small amounts of potentially toxic and hazardous materials to clean electronic components as necessary. Solid waste would not be generated by the proposed project. The facility would implement waste minimization and pollution prevention procedures now under preparation by the NRL for its facilities.

All materials used within the proposed facility and classified as toxic or hazardous would be used, handled, stored, and managed under applicable Federal and State permitting requirements. No asbestos-containing materials (asbestos content greater than 1 percent) would be used in the proposed project.

No underground storage tanks would be used at any of the alternative sites.

The No-Action Alternative would not generate or require management of solid, toxic, or hazardous materials.

5.3.6 Non-ionizing Radiation

The proposed project is a permanent, point-to-point, microwave communications system. The only non-ionizing radiation source under each of the alternatives would be microwave transmitters, located at the top of the antenna towers. The system, which will operate during normal work hours, will not cause Electromagnetic Interference or generate Electromagnetic Radiation (EMR) that would adversely affect any local organization or the local environment. Only microwave devices that meet Federal and State regulatory requirements will be used in the facility. The transmitter power requirements of the system (63mW) are considered to be low. Each stationary antenna will project all EMR directly towards the other stationary antenna. The cone or beamwidth will be 2.2°. The ERM levels generated by this system have been calculated to be not greater than 0.012mW/cm^2 . Exposure to ERM below the threshold of 5.3mW/cm^2 is considered safe to the human environment. Because of the low transmitter emission and narrow beamwidths requirements, the system would pose no EMR hazard to migratory birds, other local wildlife, or the human environment.

The No-Action Alternative would not require use of devices that produce non-ionizing radiation.

5.3.7 Noise

All the proposed alternatives would have noise impacts associated with the construction process (i.e., operation of equipment, etc.) that would be localized and short term. The operation of the antennas would not generate additional noise. None of the alternatives would create long term noise impacts.

The No-Action Alternative would not cause short or long term noise impacts.

5.3.8 Aesthetic & Visual Quality

The project design criteria requires that the antennas and related areas use design elements and materials that are consistent with other existing facilities in vicinity of the alternative sites.

The No-Action Alternative will not impact the existing aesthetic and visual quality of the sites.

5.4 IMPACTS ON ECOLOGICAL RESOURCES

The ecological resources include flora, aquatic fauna, terrestrial fauna, and endangered and threatened species. Potential impacts from the alternatives are discussed in the following paragraphs.

5.4.1 Flora, Aquatic Fauna, and Terrestrial Fauna

Summaries of available inventories and studies of flora and aquatic and terrestrial fauna in the Mobile area in which the Alternatives are located indicate that no threatened or endangered species have been identified in any of the areas affected by this EA.

The No-Action Alternative would have no impact on flora, aquatic fauna, or terrestrial fauna.

5.4.2 Endangered & Threatened Species

Threatened and endangered species surveys have been conducted in the Mobile Bay area in which the Alternatives are located. The surveys and documented sightings have not revealed any threatened or endangered species in any of the areas affected by this EA.

5.5 CUMULATIVE IMPACTS

The proposed alternatives (Alternative A & F) would be developed with required mitigation measures and meet all appropriate Federal and State regulatory requirements. Also, the proposed development size is relatively small in comparison to the existing development and the context of the major watershed, airshed, and ecological communities. As a result, the proposed alternative action would not cause any significant cumulative impacts.

6.0 RECOMMENDATION

Construction and operation of the proposed "transmission" antenna at the Alternative A site, and of the proposed "receiving" antenna at the Alternative F site is recommended for implementation of the proposed action.

Construction and operation of the proposed antennas would provide the needed communication transmission required to develop the remote sensing devices. The Alternative A and F sites are the "build" alternatives most compatible with current and future mission requirements, and have the least potential for environmental impacts, least cost, and least engineering considerations.

Construction and operation at the Alternative A and F sites would not have significant short- or long-term adverse or cumulative environmental impacts.

A Finding of No Significant Impact (FONSI) is recommended for the proposed action.

7.0 CONTACTS & REFERENCES

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